Supplementary material

Title: The effect of adiposity on differences in carotid plaque burden in studies conducted in Norway and Russia: a cross-sectional analysis of two populations at very different risk of cardiovascular mortality

The name of authors

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Supplementary material: the assessment of anthropometric measures

Height and weight were measured without shoes in light clothing. Height was measured to the nearest millimetre using a Seca® 217 portable stadiometer (Seca limited) in KYH and an electronic stadiometer (DS-103, Dongsahn JENIX Co. Ltd) in Tromsø7. Weight was measured to the nearest 100g with a TANITA BC 418 body composition analyser (TANITA, Europe GmbH) in KYH and an electronic digital scale (DS-B02, Dongsahn JENIX Co.Ltd) in Tromsø 7.

Ultrasound examination and the assessment of carotid plaaues

Carotid ultrasound examination was performed with the participant in a supine position by experienced sonographers in KYH and Tromsø7. In Tromsø7, the longitudinal still image of every plaque was digitally documented with the transducer pallarel to the vessel wall and perpendicular to the point of maximum plaque thickness using DICOM files for the offline reading of total plaque score. Only one plaque could be counted at each carotid segment (far and near wall of common carotid artery, bifurcation, and internal carotid artery of both carotid arteries). This means each participant could contribute to the maximum plaque number of twelve).

In KYH, off-line readings were made by two experienced cardiologists (AR and SM) to determine the presence of plaques and the actual number of plaques based on cine-loop of the carotid artery and still images of plaques using EchoPAC software (v.113, GE-Vingmed AS, Norten, Norway). The protocol of KYH did not involve recording the near or far wall location, and there was no restriction on how many plaques could be counted for each segment.

To make the burden of carotid plaques comparable between the two studies, we created a cumulative plaque score by assigning a score of one for the presence of one or more plaques in each of the six carotid segments (CCA, bifurcation, and ICA of each carotid artery) with a maximum possible score of six for each individual.

Systolic blood pressure

In KYH, SBP was measured three times, seated, using OMRON 705 IT automatic blood pressure monitors (OMRON Healthcare). Non-fasting venous blood samples were frozen within 2 hours of collection and stored at -20 degrees. Within three weeks, they were transferred to -80-degree freezers and eventually shipped to the laboratory in Moscow where all samples were analysed based on a standardised method.

In the Tromsø Study, SBP was recorded three times with Dinamap (ProCare 300, GE Healthcare). Both Dinamap and OMRON (used in KYH) have been validated to British Hypertension Society standards. Non-fasting venous blood samples were obtained, and fresh serum was analysed at the University Hospital laboratories.

Supplementary table 1: Interaction

Interaction between study and adiposity

Interaction: odds ratio for having at least one plaque per 1 SD increase in each adiposity measure (adiposity#study)

men	Pooled Model 1	Pooled Model 2	Pooled Model 3
BMI	0.22	0.35	0.39
WHR	0.24	0.42	0.29
women			
BMI	0.11	0.044	0.21
WHR	0.72	0.79	0.73

Model 1: adjusted for categorical age (5-year) and study, Model 2: adjust for variables in Model 1 plus potential confounders (smoking and education), Model 3: adjusted for variables in Model 2 plus potential mediators (systolic blood pressure, HDL cholesterol, LDL cholesterol, glycated haemoglobin, diabetes)

Interaction: Change in plaque score per 1 SD increase in each adiposity measure: pooled results from two studies (adiposity#study)

men	Pooled Model 1	Pooled Model 2	Pooled Model 3
BMI	0.02	0.07	0.12
WHR	0.45	0.99	0.83
women			
BMI	0.27	0.15	0.70
WHR	0.03	0.02	0.02

Model 1: adjusted for categorical age (5-year) and study, Model 2: adjust for variables in Model 1 plus potential confounders (smoking and education), Model 3: adjusted for variables in Model 2 plus potential mediators (systolic blood pressure, HDL cholesterol, LDL cholesterol, glycated haemoglobin, diabetes)

Supplementary table 2: Comparison of carotid plaque burden in KYH compared to Tromsø7 with and without adjustment for various adiposity measure (data of figure 1)

A) Odds ratios for having at least one plaque in KYH vs Tromsø7 with and without adjustment for adiposity

	Men (n=2200)	Women (n=2862)
	OR (95%CI)	OR (95%CI)
Model 1-adiposity	3.22 (2.58, 4.01)	1.90 (1.60, 2.25)
Model 2-adiposity	2.78 (2.21, 3.49)	1.97 (1.62, 2.38)
Model 2 BMI	2.79 (2.22, 3.50)	1.90 (1.56, 2.30)
Model 2 WHR	2.77 (2.20, 3.48)	1.75 (1.43, 2.14)
Model 3 - adiposity	2.51 (1.98, 3.18)	1.63 (1.33, 2.00)
Model 3 BMI	2.51 (1.98, 3.18)	1.63 (1.36, 2.04)
Model 3 WHR	2.51 (1.98, 3.18)	1.64 1.33, 2.01)

B) Differences (95%CI) in the mean number of plaques in KYH compared to Tromsø7 with and without adjustment for adiposity

	Men (n=2200)	Women (n=2862)
	Difference in number of plaque (95%CI)	Difference in number of plaque (95%CI)
Model 1-adiposity	1.03 (0.92, 1.15)	0.49 (0.40, 0.57)
Model 2-adiposity	0.89 (0.77, 1.00)	0.51 (0.42, 0.60)
Model 2 BMI	0.89 (0.77, 1.00)	0.49 (0.40, 0.59)
Model 2 WHR	0.89 (0.77, 1.00)	0.42 (0.32, 0.51)
Model 3 - adiposity	0.79 (0.67, 0.90)	0.40 (0.31, 0.49)
Model 3 BMI	0.78 (0.66, 0.90)	0.41 (0.32, 0.50)
Model 3 WHR	0.78 (0.66, 0.90)	0.38 (0.29, 0.48)